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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,546	11/03/2003	Naokatsu Ikegami	OKI.153DC	9945
20987	7590	07/19/2005	EXAMINER	
VOLENTINE FRANCOS, & WHITT PLLC ONE FREEDOM SQUARE 11951 FREEDOM DRIVE SUITE 1260 RESTON, VA 20190				CHEN, KIN CHAN
ART UNIT		PAPER NUMBER		
		1765		

DATE MAILED: 07/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/698,546	IKEGAMI, NAOKATSU	
Examiner	Art Unit		
Kin-Chan Chen	1765		

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on \_\_\_\_.

2a)  This action is **FINAL**.                    2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## **Disposition of Claims**

4)  Claim(s) 12-17 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5)  Claim(s) \_\_\_\_\_ is/are allowed.  
6)  Claim(s) 12-17 is/are rejected.  
7)  Claim(s) \_\_\_\_\_ is/are objected to.  
8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All    b)  Some \* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. 09/519,575.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)  Notice of References Cited (PTO-892)  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 110303.

4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_ .

5)  Notice of Informal Patent Application (PTO-152)

6)  Other: \_\_\_\_ .

**DETAILED ACTION*****Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 12-17 are rejected under 35 U.S.C. 103(a) as obvious over Watatani (US 6,153,511) in view of Huffman et al. (US 6,082,374; hereinafter "Huffman") or Xu et al. (US 5,908,319; hereinafter "Xu") as evidenced by Sugahara et al. (US 5,989,998).

In a method for fabricating a semiconductor device, Watatani teaches that an organic insulating layer (e.g., organic SOG) may be formed over an interconnect layer. A contact hole may be formed in an organic insulating layer (e.g., organic SOG) so as to expose the interconnect layer using a patterned resist layer formed over the organic insulating layer as a mask. The patterned resist layer may be ashed (Figs. 5A-5I; col. 7, lines 7-11). Watatani teaches removing photoresist by ashing. Watatani is not particular about the etchant. In a method for stripping photoresist, Huffman (col. 4, lines 10-12, 56-60; col. 5, lines 60-66 and examples 1, 2, 6-8) or Xu (col. 2, lines 46-60) teaches that oxygen and a mixed gas containing nitrogen and hydrogen (such as N<sub>2</sub>H<sub>2</sub>) may be used for ashing to strip the photoresist from the substrate. Since the substrate typically refers

to any well-known semiconductor structures including insulating layers or conductive layers, therefore, making organic SOG insulating layer obvious. Hence, it would have been obvious to one with ordinary skill in the art to use oxygen and a mixed gas containing nitrogen and hydrogen (such as N<sub>2</sub>H<sub>2</sub>) as taught by Huffman or Xu in the process of Watatani for ashing in order to increase the efficiency and effectiveness.

The claimed invention differs from the combined prior art by specifying forming a protective film on a surface of the contact hole during the ashing wherein the protective film is formed by reacting the organic insulating layer (e.g., organic SOG) with the nitrogen. However, because the same materials are used with the same process, it is expected that the method of the combined prior art would possess the claimed characteristic and properties, such as forming the protective by reacting the organic insulating layer with the nitrogen.

Claim 15 differ from the prior art by specifying conventional materials and process (such as forming organic SOG by adding alkyl group to a silicon oxide) to the art of semiconductor device fabrication. A person having ordinary skill in the art would have found it obvious to modify the combined prior art by adding any of same conventional materials and process to same in order to form the organic SOG with a reasonable expectation of success, see Sugahara et al. (US 5,989,998) in the record as evidence.

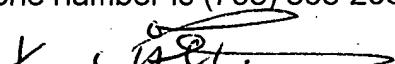
### ***Conclusion***

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3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sugahara et al. (US 5,989,998; col. 3, lines 25-42) discloses that organic SOG may be formed by adding alkyl group to a silicon oxide.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (703) 305-0222. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (703) 305-2667. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2934.

*July 15, 2005*



Kin-Chan Chen  
Primary Examiner  
Art Unit 1765